AMENDMENTS TO THE CLAIMS

1-2. (Cancelled)

3. (Previously Presented) The method of claim 48, wherein said generating step further comprises generating said PNS with an encryption algorithm.

4. (Previously Presented) The method of claim 48, wherein said combining step further comprises modulo-2 adding of said symbol indices and said PNS.

5. (Previously Presented) The method of claim 48, wherein said combining step further comprises arithmetic adding of said symbol indices and said PNS.

6-18. (Cancelled)

19. (Previously Presented) A communication device for scrambling a digital data stream for use in a non-self-synchronizing scrambling (NS3) communication system, said system supporting a variable number of bits per symbol less than or equal to a maximum number of bits per symbol, said digital data stream comprising a series of bits and having a bit transmission rate, the communication device comprising:

means for converting each N bits of the digital data stream into a symbol index to produce a stream of symbol indices;

means for generating, at a rate derived from a symbol rate and different than the bit transmission rate, a pseudo-noise sequence (PNS), said PNS comprising M output bits, wherein M is at least as large as said maximum number of bits per symbol and M is independent of N; and

means for modifying said stream of symbol indices based on said PNS to produce a symbol-wise scrambled digital data stream, wherein said symbol-wise scrambled digital data stream is capable of being descrambled by a second modifying means that is the inverse of said modifying means.

20. (Previously Presented) The communication device of claim 19, further comprising:

means for transmitting said scrambled digital data stream.

21. (Previously Presented) The communication device of claim 19, wherein said generating means is an encryption device.

22. (Previously Presented) The communication device of claim 19, wherein said modifying means is a modulo-2 adder.

23. (Previously Presented) The communication device of claim 19, wherein said modifying means is an arithmetic adder.

24. (Cancelled)

25. (Previously Presented) The communication device of claim 19, wherein said rate is a whole or fractional multiple of the time interval between each symbol in said set of symbol indices.

26-40. (Cancelled)

41. (Currently Amended) The system of claim [[53]] 54, wherein said first communication device is an Digital Subscriber Line Transceiver Unit-Central Office (DTU-C)

and said second communication device is an Digital Subscriber Line Transceiver Unit-Remote (DTU-R).

42. (Cancelled)

43. (Currently Amended) The system of claim [[53]] 54, further comprising a plurality of additional DTU-Rs, said plurality of additional DTU-Rs having the same capabilities as said second communication device.

44. (Cancelled)

45. (Currently Amended) The system of claim [[53]] 54, wherein said first communication device further comprises a FIFO register to store previous states of said first PNS generator.

46. (Currently Amended) The system of claim [[56]] 54, further comprising means for delaying said second PNS output bits, wherein said second combining means combines said delayed second PNS output bits and said symbols to produce the second symbol-wise scrambled digital data stream.

47. (Cancelled)

48. (Previously Presented) A method for scrambling a digital data stream for use in a NS3 communication system, said digital data stream comprising a series of bits and having a bit transmission rate, the method comprising the steps of:

generating a PNS , where said PNS is comprised of M bits, where M is greater than or equal to a maximum possible number of bits per symbol supported by the NS3 communication system;

converting said digital data stream to a stream of symbol indices, said stream of symbol indices having a symbol rate;

combining, at said symbol rate, said symbol indices with said PNS to produce a symbol-wise scrambled digital data stream.

49. (Previously Presented) The method of claim 48, where said combining step combines the N least significant bits of said M bits of said PNS.

50. (Previously Presented) The method of claim 48, wherein each symbol index is comprised of N bits, and wherein M is independent of N.

51. (Previously Presented) A communication system having a variable data rate and a variable number of bits per symbol, wherein the variable number of bits per symbol is less than or equal to a maximum number of bits per symbol, the system comprising:

a bit-to-symbol converter configured to operate at a current number of bits-per-symbol N, to produce a stream of symbol indices from a digital bit stream;

a PNS generator configured to maintain a state and to produce M output bits at a rate derived from a current symbol rate, wherein M is at least as large as the maximum number of bits per symbol;

means for combining the stream of symbol indices and the N least significant output bits to produce a symbol-wise scrambled digital data stream;

an encoder configured to encode the symbol-wise scrambled digital data stream; and

a modulator configured to modulate the encoded symbol-wise scrambled digital data stream.

52. (Previously Presented) The system of claim 50, wherein M is independent of N.

53. (Previously Presented) The system of claim 50, wherein the state is independent of the number of bits per symbol.

54. (Previously Presented) A non-self synchronizing scrambling (NS3) communications system, comprising:

a first communications device comprising:

a bit-to-symbol converter configured to operate at a current number of bits-per-symbol N, to produce a stream of symbol indices from a digital bit stream;

a first PNS generator configured to maintain a first state and to produce M first PNS output bits at a rate derived from a current symbol rate, wherein M is at least as large as the maximum number of bits per symbol;

first means for combining the stream of symbol indices and at least one of the first PNS output bits to produce a first symbol-wise scrambled digital data stream; and

means for transmitting the first symbol-wise scrambled digital data stream; and

a second communications device comprising:

means for receiving the first symbol-wise scrambled digital data stream;

a second PNS generator configured to maintain a second state and to produce M second PNS output bits at a rate derived from a current symbol rate;

second means for combining the first symbol-wise scrambled digital data stream and at least one of the second PNS output bits to produce a first symbol-wise descrambled digital data stream; and

a symbol-to-bit converter configured to operate at a current number of bits-per-symbol N, to produce a bit stream from the first symbol-wise descrambled digital data stream.

55. (Previously Presented) The system of claim 54, wherein the first PNS generator is further configured to initialize the first state using a predetermined value, and wherein the second PNS generator is further configured to initialize the second state using the predetermined value.

56. (Previously Presented) The system of claim 54, wherein the second communications device further comprises means for scrambling and transmitting a second digital data stream and wherein the first communications device further comprises means for receiving and descrambling the second scrambled digital data stream.

57. (Previously Presented) The system of claim 56, wherein the second communications device further comprises:

first means for converting said second digital data stream from bits into symbols; and

third means for combining said symbols and said second output bits to produce a second symbol-wise scrambled digital data stream;

and wherein the first communications device further comprises:

fourth means for combining the second symbol-wise scrambled digital data stream to produce a second symbol-wise descrambled digital data stream; and

second means for converting said second symbol-wise descrambled digital data stream from symbols into bits.

58. (Previously Presented) A method for non-self-synchronizing scrambling (NS3) in a system having a symbol rate and a symbol period equal to the inverse of the symbol rate, comprising the steps of:

in a first communication device:

initializing a first PNS generator state to a predetermined initial value on receipt of a final first symbol during a training phase;

generating first PNS output bits each symbol period;

advancing the first PNS generator state at the end of each interval in a common timing reference, where said common timing reference is a multiple of the symbol rate;

in a second communication device:

initializing a second PNS generator state to the predetermined initial value on receipt of a final second symbol during the training phase;

generating second PNS output bits each symbol period; and

advancing the second PNS generator state at the end of each interval in the common timing reference.

59. (Previously Presented) The method of claim 48, wherein said symbol rate is a whole or fractional multiple of the time interval between each symbol in said set of symbol indices.

60. (Previously Presented) The method of claim 48, further comprising:

transmitting said scrambled digital data stream.

61. (Previously Presented) The communication system of claim 54, wherein said first communications device is located at an ingress point to a communications medium and said second communications device is located at an egress point to said communications medium.